Rapport d'essai n° TR_ 19181

*Test Report n° TR_* **19181**

Test Cab: Damp heat, steady state

Test Cab : Caldo umido, regime stazionario

Ref: test procedure IL22003

Rif: procedura di test IL 22003

Product under testing ***Prodotto testato***	Compact TFT 32" Outdoor		
P/N ***P/N***	993201900100		
Lab Sample ID ***ID campione***	286 A	**Received date** ***Ricevuto il***	29/04/2019
Derived models ***Modelli derivati***	/		
Standard/Rev. Date/Ed. ***Standard/Data Revisione Ed./***	**EN 60068-2-78:2013** – Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state		
Manufacturer ***Costruttore***	AESYS S.p.A. Via Pastrengo 7c 24068 Seriate (BG) Italia Tel: +39.0352924111 www.aesys.com		
Start test date ***Data inizio test***	10/05/2019	**End test date** ***Data fine test***	11/05/2019
First issue ***Prima emissione***	14/05/2019		
Laboratory technician ***Tecnico di laboratorio***	Andrea Vanalli	Firma	
Check and approbation ***Controllo e approvazione***	Fabio Novarini	Firma	
Revision ***Revisione***	/	**Revision date** ***Data revisione***	/

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1 DUT – GENERAL PRODUCT INFORMATION
DUT – INFORMAZIONI GENERALI

The DUT (Device Under Test), named **Compact TFT 32" Outdoor**, is a variable message panel based on TFT technology used for video-information in railway applications.

DUT – Compact TFT 32" Outdoor

DUT – Product identification label

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2 TEST PROCEDURE
PROCEDURA DI TEST

The test was performed according to Aesys internal procedure *IL22003_Prova Cab – Caldo umido, regime stazionario*.

3 TEST EQUIPMENT INFORMATION
INFORMAZIONI SULLA STRUMENTAZIONE UTILIZZATA

ID	Description	Model	Manufacturer	Serial n°	Last Calibration Date	Next Calibration Date
48	Climatic room	CH2000D	Angelantoni Industrie	7029	27/02/2019	28/02/2021
112	Data acquisition control unit	MX100	Yokogawa	91N427912	13/06/2017	15/06/2019
290 356	Data acquisition input unit	MX110	Yokogawa	91P527795 91S525693	13/06/2017	15/06/2019
142	Watt meter	WT230	Yokogawa	91F611778	13/06/2017	15/06/2019

4 TEST PARAMETERS
PARAMETRI DI TEST

Test severity level :

Temp. (°C)/Humid. (%rh):
- ☐ 30°C±2°C / 93%±3%
- ☐ 30°C±2°C / 85%±3%
- ☒ 40°C±2°C / 93%±3%
- ☐ 40°C±2°C / 85%±3%
- ☐ Custom:

Duration:

☒ 12h	☐ 4 days
☐ 16h	☐ 10 days
☐ 24h	☐ 21 days
☐ 2 days	☐ 56 days

Environmental conditions:
Temperature range: 15°C to 35°C
Relative humidity: 25 to 75%
Pressure: 860 to 1060 hPa

Test measurements uncertainty:
Temperature: ± 1°C
Relative humidity: ± 5%.

The measurement uncertainties stated in this document are estimated as extended uncertainty obtained multiplying the standard uncertainty by the coverage factor *k* corresponding to a confidence level of about 95%.

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5 TEST SETUP

TEST SETUP

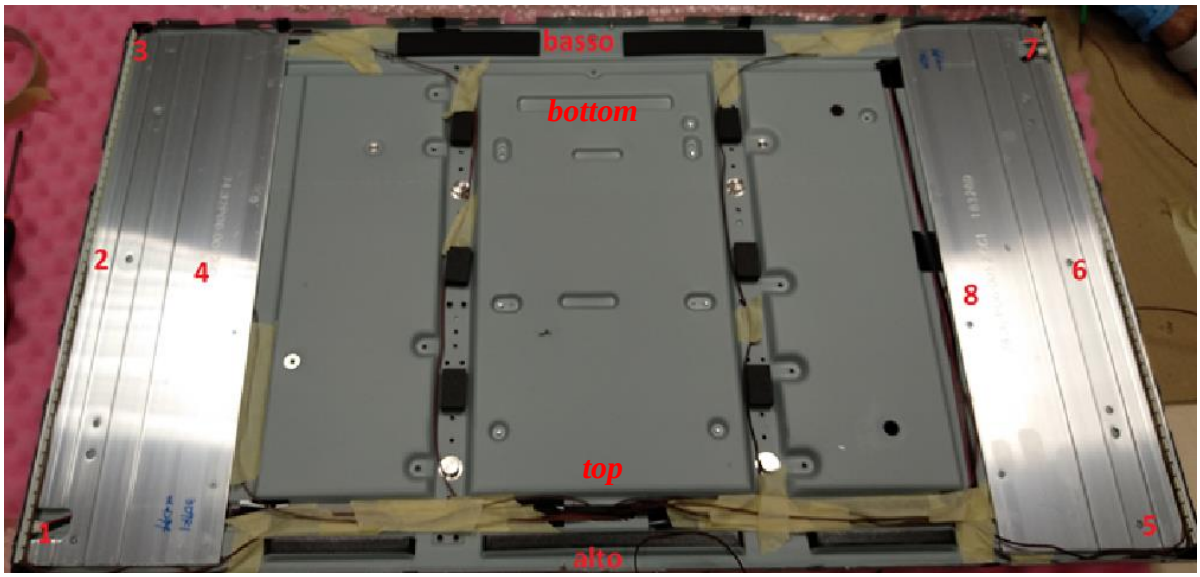
The EUT shall be place in laboratory ambient environment for 24h before introduce it into the test chamber.
Power and communication cables are connected as required for normal operation.
With DUT switched ON the temperature inside the chamber is increased to the specified severity, with a rate of change of 1°C/min.
After thermal stability is reached, it is started the specified duration.
After the time defined for the test, the humidity in the chamber is gradually decreased to 50% approx. and, subsequently, the temperature is decreased to 25°C±2°C. After a recovery time the EUT is removed from the chamber.
The following parameters and behaviour have been monitored:

Parameter/Behaviour	Evaluation criteria
Mechanical check	No mechanical damage, no cracks
Electrical check	No electrical failure, no abnormal power consumption
Display check	Correct visualization of the define image
Communication check	No loss of data communication, data exchanged are correct
Temperature	Temperature below the limit (if present)

List of thermocouples:

Channel	Position
01	TFT backlight top left
02	TFT backlight center left
03	TFT backlight bottom left
04	TFT heat sink left
05	TFT backlight top right
06	TFT backlight center right
07	TFT backlight bottom right
08	TFT heat sink right
09	T-con
10	LED drive
11	Air box
12	1609 board temperature sensor
28	Chamber temperature

The thermocouples are located in the following points:



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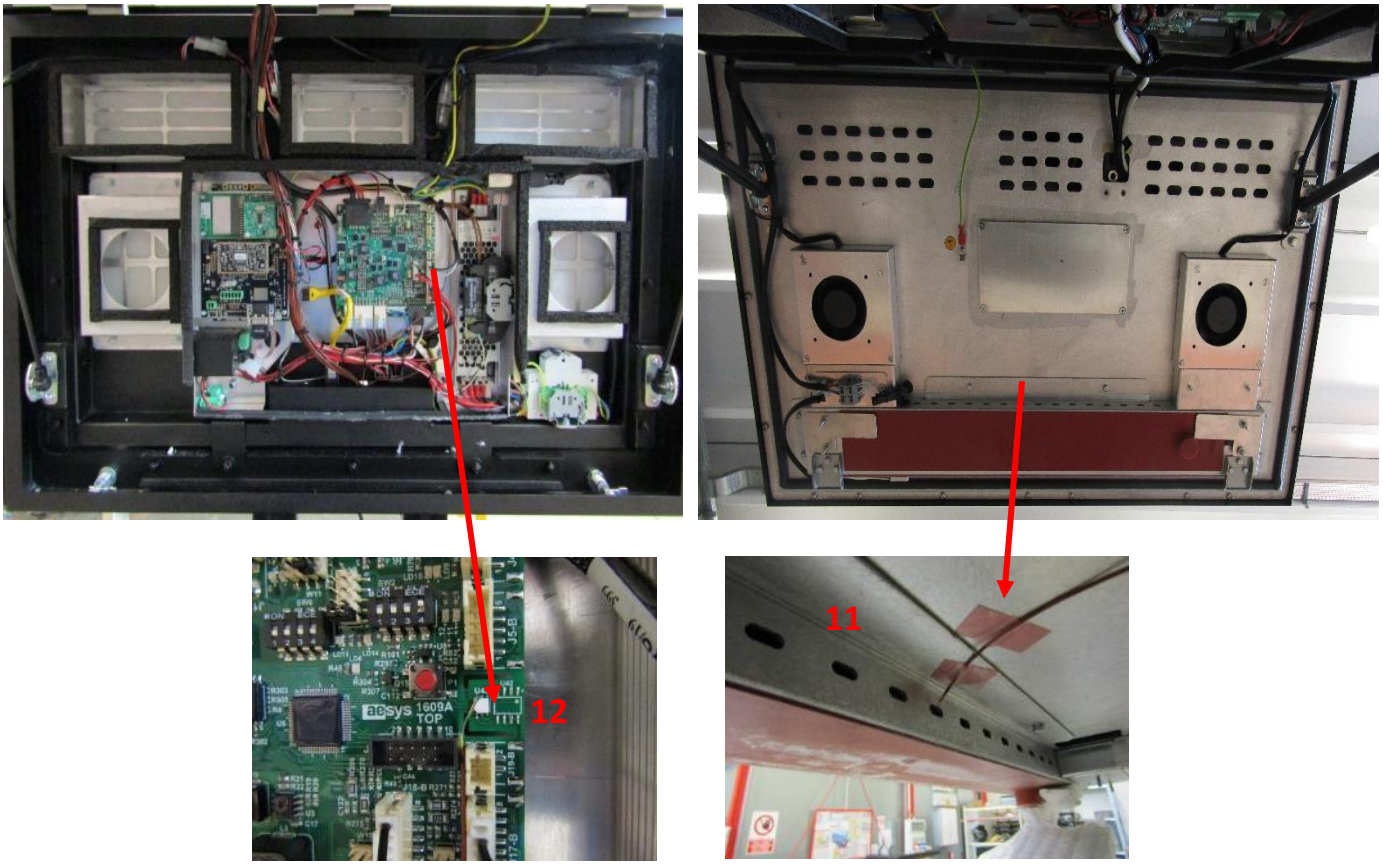

The setup of the test is shown in the following pictures:

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6 TEST RESULTS
RISULTATI DEI TEST

6.1 Environmental Conditions
Condizioni ambientali

Parameter	Requirement	Result	Verdict
Environmental temperature	Between +15°C and +35°C	22,1°C	**Pass**
Relative humidity	Between 25% and 75%	46,1%	**Pass**
Pressure	Between 860 and 1060 hPa	1010 hPa	**Pass**

6.2 Startup verification
Verifica iniziale

Test	Evaluation criteria	Result	Verdict
Mechanical check	No mechanical damage, no cracks	No mechanical damage	**Pass**
Electrical check	No electrical failure, no abnormal power consumption	Voltage: 221.40 V Current: 0.282 A Power: 52.20 W	**Pass**
Display check	Correct visualization of the define image	No loss of visualization	**Pass**
Communication check	No loss of data communication, data exchanged are correct	Constant communication	**Pass**
Temperature	Temperature below the limit (if present)	No temperature limit	**Pass**

6.3 End test verification
Verifica al termine del test

Test	Evaluation criteria	Result	Verdict
Mechanical check	No mechanical damage, no cracks	No mechanical damage	**Pass**
Electrical check	No electrical failure, no abnormal power consumption	Voltage: 227.98 V Current: 0.274 A Power: 54.60 W	**Pass**
Display check	Correct visualization of the define image	No loss of visualization	**Pass**
Communication check	No loss of data communication, data exchanged are correct	Constant communication	**Pass**
Temperature	Temperature below the limit (if present)	No temperature limit	**Pass**

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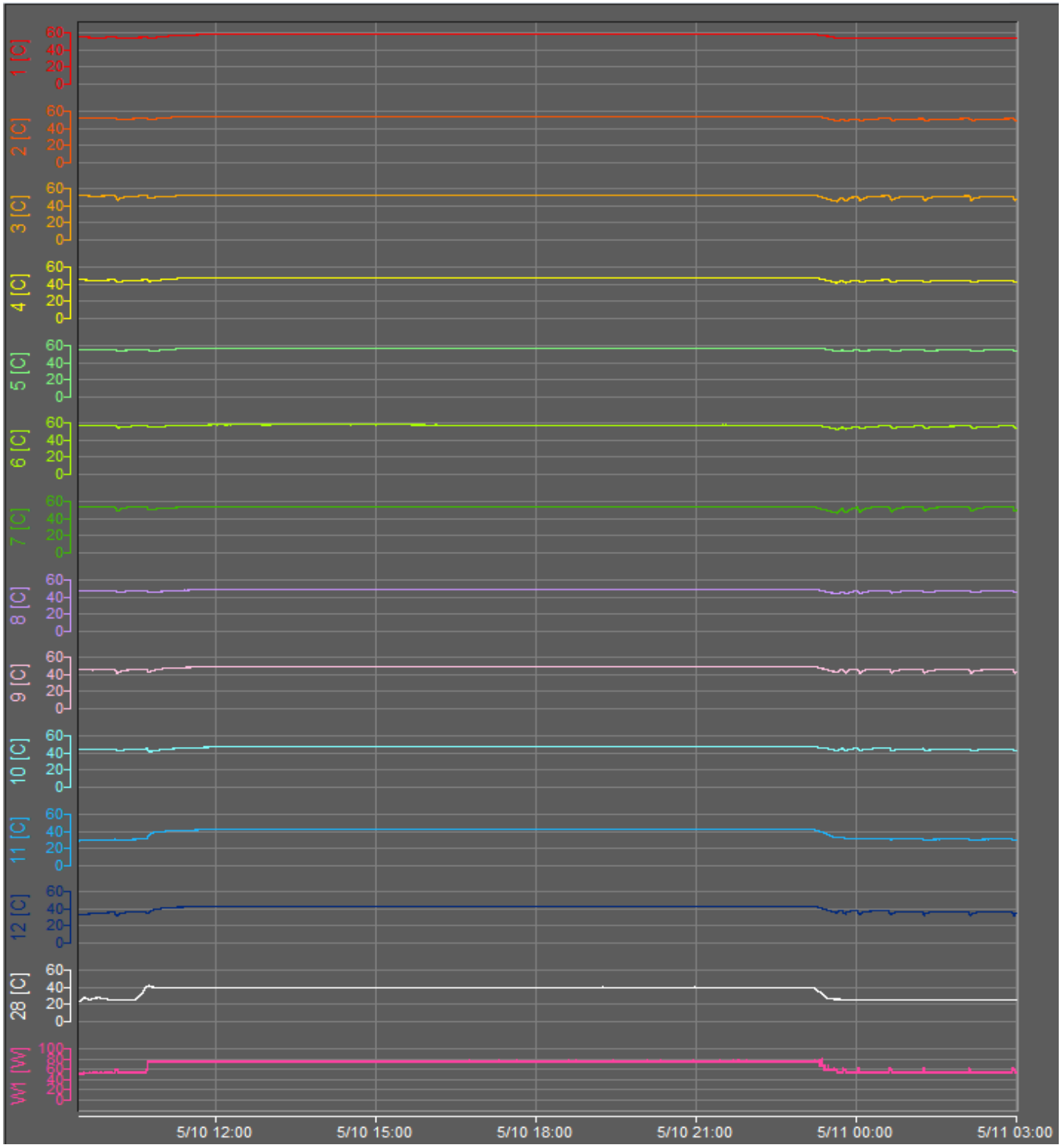
6.4 Test data
Dati del test

The following graph shows the internal temperature, the environmental temperature and the power measured during the entire thermal cycle.



<Graph of the measured temperatures>

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The maximum temperatures are recorded in the table:

Channel	Position	max. temperature measured after steady state, (°C)	Limit (°C)
01	TFT backlight top left	57.8	-
02	TFT backlight center left	54.1	-
03	TFT backlight bottom left	52.1	-
04	TFT heat sink left	47.5	-
05	TFT backlight top right	57.5	-
06	TFT backlight center right	57.3	-
07	TFT backlight bottom right	53.2	-
08	TFT heat sink right	48.8	-
09	T-con	48.9	-
10	LED drive	47.0	-
11	Air box	42.1	-
12	1609 board temperature sensor	42.8	-
28	Chamber temperature	39.9	-

Test	Evaluation criteria	Result	Verdict
Damp heat, steady state	No mechanical and electrical failure No loss of performance No thermal hazard	No mechanical and electrical failure No loss of performance No thermal hazard	**Pass**

6.5 Additional information / Notes:

Informazioni aggiuntive / Note:

END OF TEST REPORT

Fine del test report

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